DOCUMENT RESUME

ED 075 017 JC 730 087

AUTHOR	Wermers, Donald J.
TITLE	Achievement by Junior College Transfer, Four-Year College Transfer, and Native Juniors as Measured by the CLEP General Examinations.
INSTITUTION	Illinois Univ., Urbana. Office of School and Coll. Relations.
PUB DATE	Mar 72
NOTE	25p.; Paper presented at Annual Meeting of American Educational Research Association (New Orleans, Louisiana, February 25-March 1, 1973)
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Academic Ability; Academic Achievement; College Students; *Junior College Students; Literature; Post Secondary Education; *Socioeconomic Status; Technical Reports; *Transfer Programs; *Transfer Students
IDENTIFIERS	CLEP; *College Level Examination Program

ABSTRACT

The achievements of junior college transfer students, four year college transfer students and native juniors as measured by the College Level Examination Program (CLEP) are compared in this study. The data indicated that junior college transfers rank lower than four-year college transfers and natives in academic ability and socioeconomic status. Junior college transfers also scored lower than other groups on CLEP General Examinations. Differences between the four-year groups were not as clear. In biological sciences, four-year transfer women scored higher than native women; four-year transfer women also achieved higher scores in literature. (Author/RS)

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

ACHIEVEMENT BY JUNIOR COLLEGE TRANSFER, FOUR-YEAR COLLEGE TRANSFER, AND NATIVE JUNIORS AS MEASURED BY THE CLEP GENERAL EXAMINATIONS

by

Donald J. Wermers

Assistant Director

University Office of School and College Relations
University of Illinois
Research Memorandum 72-5
March 1972

UNIVERSITY OF CALIF.
LOS ANGELES

MAY 11 1973

CLEARINGHOUSE FOR
JUNIOR COLLEGE
INFORMATION

SUMMARY

The present memorandum is based in part on a doctoral thesis completed under the direction of Dr. J. S. Zaccaria, and with the assistance of committee members Dr. E. F. Anderson, Dr. J. W. Loeb, Dr. T. O'Banion, and Dr. D. J. Delaney. The thesis was submitted in partial fulfillment of the requirements for the degree of Doctor of Education in the Graduate College of the University of Illinois at Urbana-Champaign in 1971.

This study compared the achievement of junior college transfer, four-year college transfer, and native juniors as measured by the CLEP General Examinations. Sex, age, academic ability (ACT and HSPR), socioeconomic status (SES), progression toward a baccalaureate degree, and the number of courses completed in examination areas were controlled either by sampling procedures or statistical procedures.

The data clearly indicated that junior college transfer students rank lower than four-year transfer students and natives on ACT, HSPR, and SES. Junior college transfer students also scored lower than the four-year groups on standard scores achieved on the CLEP General Examinations, the common criteria of achievement. Differences between natives and four-year transfers on ACT, HSPR, SES and CLEP scores were not as clear.

Differences on mean CLEP scores among the groups diminished when the control variables were applied in the analysis of covariance technique. Most analyses resulted in nonsignificant differences. However, significant differences were noted in Natural Sciences, where four-year transfer women achieved higher scores than native women in the Biological Sciences area; and in Humanities, where four-year transfer women achieved higher scores than either native women or junior college transfer women in the Literature area. The results of this study seem to indicate that, generally, students who completed lower division requirements in junior colleges and then transferred to the University of Illinois progressed academically during the first two years of college at a pace equivalent to students who completed lower division requirements in four-year institutions.

ACHIEVEMENT BY JUNIOR COLLEGE TRANSFER FOUR-YEAR COLLEGE TRANSFER, AND NATIVE JUNIORS AS MEASURED BY THE CLEP GENERAL EXAMINATIONS

Many students, either by choice or of necessity, experience a pattern of college attendance which requires transfer from one institution to another before they complete their baccalaureate degree requirements. Recent literature, especially the many studies concerned with the characteristics and performance of undergraduate transfer students, indicate that student mobility between all types of institutions is greater now than at any previous period in the history of higher education (Hills, 1965; Illinois Council on Articulation, 1971; Knoell and Medsker, 1965; Trent and Medsker, 1968; Willingham and Findikyan, 1969). This increasing rate of student mobility creates a need to study the equivalency of results of educational experiences at different kinds of institutions.

Since the 1920's, many studies, several of which were reviewed by Hills (1965), have compared transfer students and native students on various academic success criteria. However, the great majority of studies which included comparisons of student achievement level at time of transfer used grade-point averages as achievement criteria. Lavin (1965) reported that grade-point averages lack a high degree of comparability because grades awarded at different institutions are based on different criteria. Many studies did not report methods of controlling for individual differences in academic and nonacademic student characteristics which research has shown to be correlated with academic performance.

Recent development in college level achievement batteries have made possible more precise comparisons of two- and four-year college students based on common criteria. The few studies which have attempted comparisons based on standardized achievement examinations tend to support the assumption of equivalent achievement for students who completed their lower division courses in different types of institutions (Jordan, 1961; Kirk, 1958; Kochersberger, 1966; and Rodes, 1949). Since these studies did not

account for individual differences related to achievement at time of transfer, further study with more precise measures of both criteria and concomitant variables are needed.

Purpose of Study

This study tested the tenability of the implied assumption of equivalent achievement for students of similar characteristics who have attended three different types of institutions--junior colleges, a multiversity, and other four-year institutions. The purpose of this study was to analyze the relative academic achievement levels of native students and students transferring from other four-year colleges and junior colleges to the University of Illinois at Urbana-Champaign. A second purpose was to compare junior college transfer students, four-year college transfer students, and native students on selected academic and nonacademic characteristics.

Scores earned on the General Examination battery of the College Level Examination Program administered at the beginning of the junior year

served as the common criterion of achievement. Sex, age, academic ability, socioeconomic status, progression toward a baccalaureate degree and the number of courses completed in the area of examination were controlled either by sampling procedures or statistical procedures. The specific objectives of the study were:

(1) to determine the differences which exist among four-year transfer students, junior college transfer students, and native students on high school percentile rank, ACT-composite, semester hours completed in selected subject areas, and socioeconomic status; and, using these characteristics as control variables,

(2) to determine the differences which exist in the academic achievement among four-year transfer students, junior college transfer students, and native students at the beginning of their junior year based on scores achieved on the General Examinations of the College Level Examination Program (CLEP).

Method

Subjects

Subjects for this study were 303 students beginning their junior year at the University of Illinois at Urbana-Champaign in Fall 1970. Subjects were classified into three groups according to type of institution attended while completing

the first two years of a baccalaureate degree program.

One group consisted of 91 native students who had completed all previous work at the University of Illinois. One-hundred seven students who transferred to the University of Illinois after completing all previous work at one or more junior colleges comprised a second group. The third group consisted of 105 students who enrolled at the University of Illinois after completing all previous work at one or more other four-year institutions. Subjects were volunteer participants from their respective populations, all of whom had earned at least 60 but not more than 80 semester hours (or equivalent) of baccalaureate-oriented college work, had graduated from high school in the spring of 1968, and were born in 1949, 1950, or 1951.

A multiple discriminant analysis computed on each of the three groups by sex showed that, with the exception of men junior college transfer students, the samples were representative of their respective populations on high school percentile rank (HSPR), ACT-composite (ACT-C), and lower division GPA. Men junior college transfer participants were representative on lower division GPA but scored significantly higher (.05 level) than nonparticipants on HSPR and ACT-C. Since HSPR and ACT-C were statistically controlled in the analysis of the criteria, these differences were not considered a major factor in the study.

Instrumentation

All subjects were administered the complete General Examination battery of the College Level Examination Program and the Index of Class Position (ICP) at the beginning of the 1970 Fall Semester.

The General Examination Battery of the College Level Examination Program, Form PCT 2. This battery, used as the common criterion, consists of five tests--English Composition, Humanities, Mathematics, Natural Sciences, and Social Sciences-History.

These examinations are purported to be particularly relevant to the kinds of intellectual experiences students can be expected to have completed by the end of two years in college. The General Examinations are most frequently used to assess the general educational background of students who have completed one or two years of college work or its equivalent. Each of the five General Examinations is an objective test consisting of multiple-choice questions (College Entrance Examination Board, 1967).

With the exception of English Composition, each of the General Examinations yields a basic score and two subscores. The Humanities test yields subscores for fine arts and for literature; Mathematics yields subscores for basic skills and course content; Natural Sciences for biological sciences and physical sciences; Social Sciences-History yields subscores for both social sciences and history. All together 13 scores are reported for the General Examinations--5 basic scores and 8 subscores.

All scores are reported in standard score form. The five basic tests were scaled to scores ranging from 200 to 800, with a mean of 500 and a standard deviation of 100; and the eight subscores were scaled to two-digit scores ranging from 20 to 80, with a mean of 50 and a standard deviation of 10.

The Index of Class Position (ICP). The ICP, which purports to measure an individual's position in the socioeconomic class structure, was used to obtain data for the socioeconomic status control variable. The ICP is based on two components; (1) occupation, as measured by Hollingshead's seven-point scale of occupational prestige (collected on students' fathers), and (2) class identification, the respondents estimate of class position of his family (Ellis, Lane, and Olesen; 1963).

Statistical Analyses

Multivariate analyses of covariance were used to determine significant differences among the three groups on means of the 13 CLEP scores for each sex (Winer, 1962). On the basis of logical considerations and past research evidence, characteristics identified as correlates of academic performance were used as covariates. These characteristics were HSPR, ACT-C, socio-economic status, and semester hours earned in the area of CLEP examination scores. The analysis of variance technique was used to obtain empirical evidence of significant differences among the three groups on means of the proposed covariates. The magnitude of the F ratios obtained determined which characteristics were used as covariates. Any variable with an F ratio that resulted in a level of significance equal to or less than .20 was used as a covariate.

Homogeneity of regression is an assumption that must be met to use analysis of covariance (Elashoff, 1969; Kirk, 1968; Lord, 1960). A test of homogeneity of regression was run for each proposed analysis of covariance. Analysis of covariance was not computed on any criterion score that had a significant (.05) F ratio on the test of homogeneity of regression.

The Scheffé method of judging all contrasts was used for making a posteriori tests when the F ratios obtained by the analysis of variance on high school percentile rank, ACT-composite, and Index of Class Position were significant at the .05 level. The Scheffé method was also used when the F ratios obtained by the analysis of covariance on criteria scores were significant at the .05 level

Results and Discussion

Comparisons of Subjects on Proposed Covariates

Measures of characteristics that research has shown to be correlated with academic achievement have been proposed as covariates in the multivariate analysis of covariance technique to analyze the relative achievement level of the three groups under study. Table 1 reports a summary of means, rank of groups, and standard deviations on HSPR, ACT-C, and ICP for each of the three groups of beginning juniors (natives, junior college transfers, and four-year transfers) by sex. The data for both men and women show that junior college transfer students as a group score lower and possess greater variability on academic characteristics (HSPR and ACT-C) than

TABLE 1

MEANS, RANK OF GROUPS, AND STANDARD DEVIATIONS OF SELECTED CHARACTERISTICS BY SEX, AND GROUP

	MEN								
	NATIVES (N=48)			JUNIOR COLLEGE TRANSFERS (N=81)			FOUR-YEAR TRANSFERS (N=52)		
Characteristic	Mean	Rank	SD	Mean	Rank	SD	Mean	Rank	SD
High School Percentile Rank	88.29	1	10.22	74.72	3	17.45	80.32	2	14.34
ACT-Composite	26.96	1	3.13	24.47	3	3.26	26.65	2	2.40
Index of Class Position (ICP)*	3.15	2	1.18	3.59	3	1.23	2.92	1	1.01
	WOMEN								
	(N=43)			(N=26)			(N=53)		
High School Percentile Rank	88.19	2	11.85	83.73	3	15.09	88.85	1	9.66
ACT-Composite	26.40	1	2.83	23.46	3	4.34	25.55	2	3.31
Index of Class Position (ICP)*	2.88	2	1.18	3.42	3	1.33	2.74	1	0.90

* Numerical range of ICP scale is from 1 to 6, with 1 representing high and 6 representing low socioeconomic status.

their four-year counterparts. These findings are consistent with past research (Cross, 1968; Illinois Council on Articulation, 1971). Junior college transfer students also come from family environments of lower socioeconomic status (high numerical value on ICP) than natives or four-year transfer students. This finding, too, is consistent with past research.

An analysis of variance (ANOVA) was run on each of the academic characteristics, HSPR and ACT-C scores, and on the nonacademic characteristic, ICP, to determine whether the means of the three groups differed significantly. F ratios on all three characteristics for men, as shown in Table 2, were significant at the .01 level. For women, the F ratio was significant at the .01 level on ACT-C, at the .05 level on ICP, and at the .20 level on HSPR. On the basis of these results, HSPR, ACT-C and ICP were accepted as covariates for all analyses of covariance on CLEP scores for both men and women.

Table 3 reports the results of the Scheffé test for judging all contrasts on characteristics with a significant F ratio at the .01 and .05 levels. All mean-pair contrasts on HSPR for men were significant with native juniors ranking high and junior college transfer juniors low. The Scheffé test on ACT-C for men also resulted in significant mean-pair contrasts between natives and junior college transfers, and between four-year transfers and junior college transfers. Differences between natives and four-year transfers were not significant. Mean-pair contrasts on ICP for men between four-year transfers and junior college transfers, and between natives and junior college transfers were significant. Differences between four-year transfers and natives on ICP were not significant.

The Scheffé test on ACT-C for women resulted in significant differences for all contrasts with the native junior group scoring high and the junior college transfer group scoring low. Mean-pair

TABLE 2

ANALYSIS OF VARIANCE TABLES ON HIGH SCHOOL PERCENTILE RANK, ACT-COMPOSITE, AND INDEX OF CLASS POSITION BY SEX

MEN					WOMEN				
Source	df	SS	MS	F	Source	df	SS	MS	F
HIGH SCHOOL PERCENTILE RANK									
Between	2	5569	2784	12.47*	Between	2	486	243	1.76
Within	178	39747	223		Within	119	16442	138	
Total	180	45316			Total	121	16928		
ACT-COMPOSITE									
Between	2	245	123	13.62*	Between	2	141	7.07	6.11*
Within	178	1604	9		Within	119	1378	1.16	
Total	180	1849			Total	121	1519		
INDEX OF CLASS POSITION									
Between	2	15			Between	2	8	4.20	3.45**
Within	178	239	7.70	5.73*	Within	119	145	1.22	
Total	180	254	1.34		Total	121	153		

* $P < .01$ ** $P < .05$

comparisons were also found to be significant for women on ICP between four-year transfers and junior college transfers, and between natives and junior college transfers. Differences between four-year transfers and natives were not significant.

Means and standard deviations of semester hours (or equivalent) completed in subject areas corresponding to CLEP General Examinations are illustrated in Table 4. The table also includes F ratios and probability levels computed by analysis of variance. Subject areas for which the

TABLE 3

RESULTS OF THE SCHEFFE TEST ON HIGH SCHOOL PERCENTILE RANK, ACT-COMPOSITE, AND INDEX OF CLASS POSITION BY SEX

MEN

HIGH SCHOOL PERCENTILE RANK

Group	Means	Differences Among Means: Jr. Col. Transfers	Four-Year Transfers	Natives
Jr. College Transfers	74.72	--	5.66*	13.57*
Four-Year Transfers	80.38		--	7.91*
Natives	88.29			--

($S_{.05}$ = 3.29)

ACT-COMPOSITE

Group	Means	Differences Among Means: Jr. Col. Transfers	Four-Year Transfers	Natives
Jr. College Transfers	24.27	--	2.18*	2.49*
Four-Year Transfers	26.65		--	0.31
Natives	26.96			--

($S_{.05}$ = 0.663)

INDEX OF CLASS POSITION

Group	Means**	Differences Among Means: Four-Year Transfers	Natives	Jr. Col. Transfers
Four-Year Transfers	2.92	--	0.23	0.67*
Natives	3.15		--	0.44*
Jr. College Transfers	3.59			--

($S_{.05}$ = 0.246)

WOMEN

HIGH SCHOOL PERCENTILE RANK

(ANOVA not significant at the .05 level.)

ACT-COMPOSITE

Group	Means	Differences Among Means: Jr. Col. Transfers	Four-Year Transfers	Natives
Jr. College Transfers	23.46	--	2.09*	2.94*
Four-Year Transfers	25.55		--	0.85*
Natives	26.40			--

($S_{.05}$ = 0.322)

INDEX OF CLASS POSITION

Group	Means**	Differences Among Means: Four-Year Transfers	Natives	Jr. Col. Transfers
Four-Year Transfers	2.73	--	0.15	0.69*
Natives	2.88		--	0.54*
Jr. College Transfers	3.42			--

($S_{.05}$ = 0.308)

* $P < .05$

** Low means reflect high socioeconomic status; high means reflect low socioeconomic status.

TABLE 4

MEANS AND STANDARD DEVIATIONS OF SEMESTER HOURS (OR EQUIVALENT) COMPLETED IN SUBJECT AREAS RELATING TO CLEP GENERAL EXAMINATIONS BY SEX AND GROUP; WITH F RATIOS AND PROBABILITY LEVELS FROM ANALYSES OF VARIANCE

Subject Area	Natives		Jr. Col. Transfers		Four-Yr. Transfers		Analysis of Variance	
	Mean	SD	Mean	SD	Mean	SD	F Ratio	P
MEN								
							(df = 2; 178)	
English Composition	6.58	1.03	6.05	0.74	3.44	2.17	76.96	.000*
Biological Sciences	3.98	3.91	4.06	4.72	2.63	4.72	1.77	.17 *
Physical Sciences	11.23	8.44	11.78	7.59	13.00	9.77	0.59	.56
Mathematics	11.58	6.38	10.27	7.23	10.33	6.89	0.61	.55
Fine Arts	1.52	3.59	0.90	1.88	2.12	4.10	2.41	.09 *
Literature	1.00	2.17	2.88	3.67	3.32	2.94	7.97	.001*
Social Sciences	5.83	6.15	6.04	4.68	6.54	6.52	0.21	.81
History	2.22	3.92	5.20	4.07	3.98	5.50	6.60	.002*
WOMEN								
							(df = 2; 119)	
English Composition	7.26	1.26	6.04	0.20	4.06	2.59	35.64	.000*
Biological Sciences	5.70	3.94	7.08	3.55	3.11	3.10	12.95	.000*
Physical Sciences	5.88	8.42	4.88	7.89	4.13	3.80	0.82	.55
Mathematics	3.95	4.95	5.54	5.59	2.92	4.24	2.60	.08 *
Fine Arts	6.23	12.06	3.58	8.46	5.74	10.55	0.53	.60
Literature	5.07	6.04	5.81	3.78	6.47	5.33	0.82	.56
Social Sciences	8.37	4.78	8.85	5.79	9.26	6.11	0.30	.75
History	3.51	4.27	6.71	4.57	5.09	5.69	3.54	.03 *

* $P < .20$ Characteristic will be used as a covariate for the analysis of covariance on related CLEP examination

ANOVA resulted in F ratios significant at the .20 level were accepted as covariates for the analyses of covariance on related CLEP scores.

Table 5 illustrates the covariates used for each analysis of covariance. HSPR, ACT-C, and ICP were accepted as covariates for all 26 proposed analyses of covariance--each of the 13 CLEP scores for both men and women. The total of semester hours completed in the areas of the two subscores was used as the semester-hour covariate

TABLE 5

SUMMARY OF THE CRITERIA AND COVARIATES USED IN THE MULTIVARIATE ANALYSES OF COVARIANCE COMPUTED ON EACH CLEP EXAMINATION AND SUBSCORE FOR MEN AND WOMEN

Criteria	Men				Women			
	Covariates				Covariates			
CLEP Examinations and Subscores	HSPR	ACT	ICP	HRS*	HSPR	ACT	ICP	HRS*
1. English Composition	x	x	x	x	x	x	x	x
2. Natural Sciences	x	x	x	x	x	x	x	x
a. Biological Sciences	x	x	x	x	x	x	x	x
b. Physical Sciences	x	x	x		x	x	x	
3. Mathematics	x	x	x		x	x	x	x
a. Basic Skills	x	x	x		x	x	x	x
b. Content	x	x	x		x	x	x	x
4. Humanities	x	x	x	x	x	x	x	
a. Fine Arts	x	x	x	x	x	x	x	
b. Literature	x	x	x	x	x	x	x	
5. Social Sciences-History	x	x	x	x	x	x	x	x
a. Social Sciences	x	x	x		x	x	x	
b. History	x	x	x	x	x	x	x	x

*HRS = Semester hours completed in subject area of examination.

for the analysis of covariance on the three-digit basic score for Natural Sciences for men and women, Humanities for men, and Social Sciences-History for men and women. The total of semester hours earned in mathematics courses was used as the covariate for the Mathematics basic score and its two subscores for women.

Comparisons of Subjects on Criteria

Table 6 presents a summary of means, rank of groups, and standard deviations of CLEP General Examination three-digit basic scores and two-digit subscores for the three groups of beginning juniors studied. Figure 1 graphically illustrates the rankings of the three groups on the basic scores.

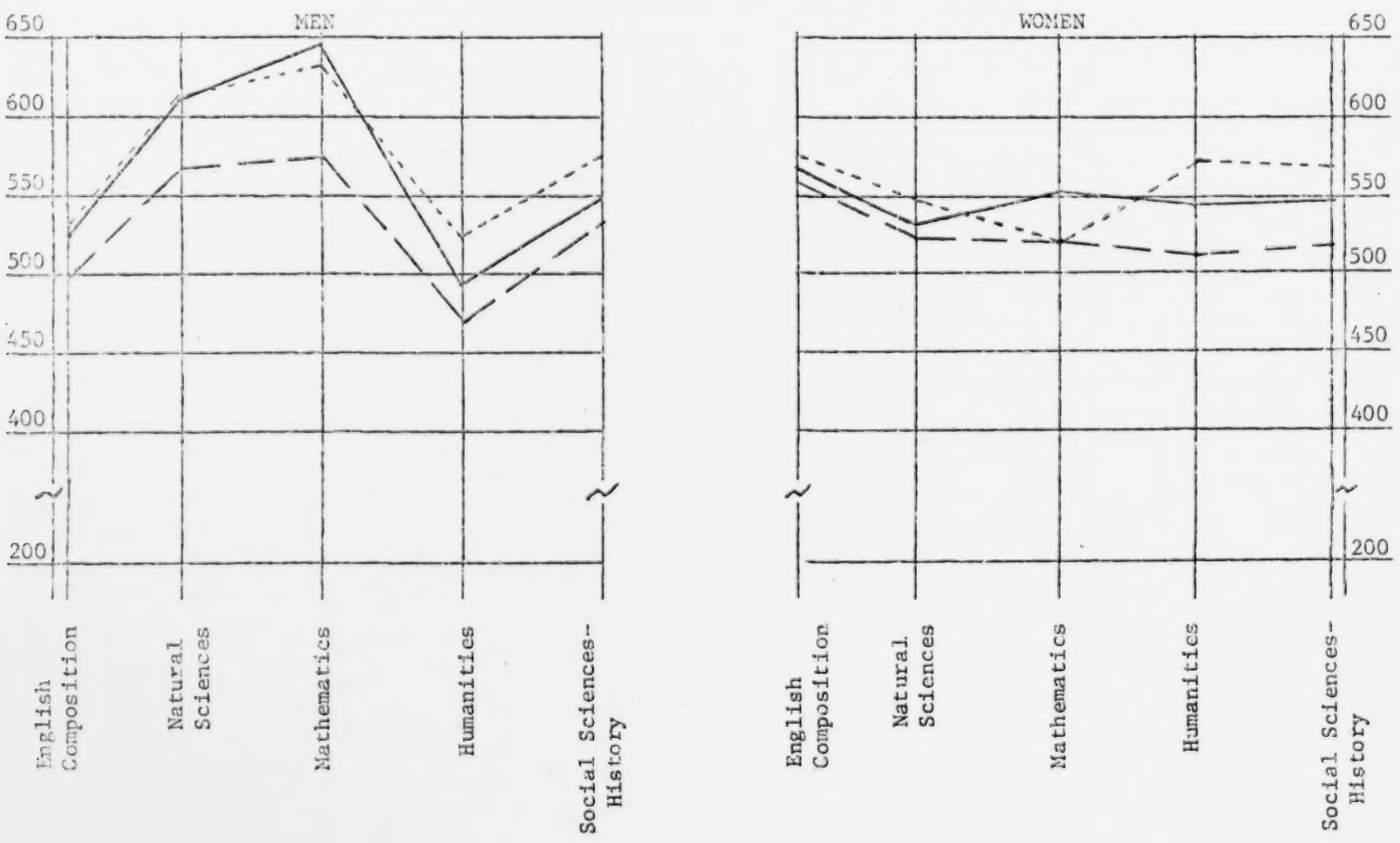
TABLE 6

MEANS, RANK OF GROUPS, AND STANDARD DEVIATIONS OF CLEP GENERAL EXAMINATION BASIC SCORES AND SUBSCORES BY SEX, GROUP, AND EXAMINATION

Examination	NATIVES (N=48)			JUNIOR COLLEGE TRANSFERS (N=81)			FOUR-YEAR COLLEGE TRANSFERS (N=52)		
	Means	Rank	SD	Means	Rank	SD	Means	Rank	SD
MEN									
1. English Composition	526	2	76	499	3	79	527	1	64
2. Natural Sciences	614	2	99	567	3	83	615	1	89
a. Biological Sciences	59	1	10	54	3	9	59	1	9
b. Physical Sciences	62	1	10	58	3	9	62	1	9
3. Mathematics	645	1	110	577	3	100	638	2	108
a. Basic Skills	63	1	10	57	3	9	63	1	9
b. Content	64	1	12	58	3	11	64	1	12
4. Humanities	491	2	81	470	3	76	522	1	71
a. Fine Arts	49	2	8	46	3	8	52	1	8
b. Literature	49	2	8	47	3	8	52	1	7
5. Social Sciences-History	549	2	84	538	3	76	579	1	76
a. Social Sciences	56	2	8	54	3	7	59	1	7
b. History	52	2	8	52	2	9	55	1	9
WOMEN									
	(N=43)			(N=26)			(N=53)		
1. English Composition	568	2	65	557	3	70	575	1	60
2. Natural Sciences	537	2	79	521	3	56	549	1	85
a. Biological Sciences	55	2	10	54	3	7	57	1	10
b. Physical Sciences	52	1	8	50	3	6	52	1	7
3. Mathematics	551	1	105	519	2	99	519	2	87
a. Basic Skills	56	1	11	52	2	9	52	2	9
b. Content	54	1	10	52	2	10	51	3	9
4. Humanities	546	2	68	512	3	72	572	1	72
a. Fine Arts	55	2	8	51	3	8	57	1	8
b. Literature	53	2	7	51	3	7	56	1	7
5. Social Sciences-History	549	2	82	521	3	54	568	1	75
a. Social Sciences	57	2	8	53	3	5	58	1	8
b. History	51	2	10	51	2	7	54	1	8

FIGURE 1

PROFILES OF NATIVES, JUNIOR COLLEGE TRANSFERS, AND FOUR-YEAR COLLEGE TRANSFERS ON MEANS OF CLEP GENERAL EXAMINATION BASIC SCORES BY SEX



It is interesting to note that all but three (Humanities for native men, 491; Humanities for junior college transfer men, 470; and English Composition for junior college transfer men, 499) of the 30 basic score means reported for all groups were above the national mean (500).

A rank ordering of the three-digit basic examination scores by group (before scores were adjusted by analysis of covariance) shows that both men and women junior college transfer groups achieved lower mean scores on all five examination areas than the native groups and, with one exception--Mathematics, for women--the four-year transfer groups. Four-year transfers scored higher than natives on all basic scores except Mathematics.

English Composition. F ratios obtained by analysis of covariance (Table 7) show that the differences among natives, four-year transfers, and junior college transfers on the means of scores earned on the English Composition examination were not significant when HSPR, ACT-C, socioeconomic status (ICP), and semester hours completed in English Composition were covaried. These findings apply to both men and women.

Natural Sciences. F ratios in Table 8 indicate that, for men, the differences among native juniors,

TABLE 7

ANALYSIS OF COVARIANCE TABLE FOR THE CLEP ENGLISH COMPOSITION EXAMINATION BY SEX

MEN					WOMEN				
Source	df	SS	MS	F	Source	df	SS	MS	F
Between	2	2321	1161	0.34	Between	2	4364	2182	0.93
Within	174	595961	3425		Within	115	271246	2358	
Total	176	598282			Total	117	275610		

TABLE 8

ANALYSIS OF COVARIANCE TABLES FOR THE CLEP NATURAL SCIENCES EXAMINATION AND SUBSCORES BY SEX

MEN					WOMEN				
Source	df	SS	MS	F	Source	df	SS	MS	F
NATURAL SCIENCES									
Between	2	2273	1136	0.26	Between	2	32962	16481	4.31*
Within	174	754725	4336		Within	115	440238	3828	
Total	176	756798			Total	117	473200		
BIOLOGICAL SCIENCES									
Between	2	151	75	1.25	Between	2	604	302	4.30*
Within	174	10475	60		Within	115	8071	70	
Total	176	10626			Total	117	8675		
PHYSICAL SCIENCES									
Between					Between	2	15	8	0.18
Within		(Not Applicable)**			Within	116	4991	43	
Total					Total	118	5006		

* $P < .05$

** Analysis of covariance not computed. Significant F ratio for test of homogeneity of regression.

four-year college transfer juniors, and junior college transfer juniors on mean scores of the CLEP Natural Sciences examination were not significant when HSPR, ACT-C, socioeconomic status (ICP), and number of semester hours completed in natural sciences courses were statistically controlled. However, a significant F ratio was obtained for women on the Natural Sciences examination using the same control variables. The significant F ratio for the Biological Sciences subscore, when considered with the nonsignificant F ratio for the Physical Sciences subscore, indicates that

the differences among the three groups of women observed for the Natural Sciences basic score appeared to be centered in the biological sciences area.

Analysis of the means adjusted by analysis of covariance using the Scheffé test (Table 9) found that four-year transfer women achieved significantly higher than native women on both the Natural Sciences basic score and the Biological Sciences subscore. Differences between junior college transfers and natives, and between four-year college transfers and junior college transfers were not significant.

Mathematics. Mean differences for women among the three groups on Mathematics basic and subscores were not significant, as indicated by F ratios in Table 10, when correlates of academic performance were controlled. Also, the findings showed no significant differences for males among the three groups on the Basic Skills subscore of the CLEP

TABLE 9

RESULTS OF THE SCHEFFÉ TEST ON THE NATURAL SCIENCES EXAMINATION AND BIOLOGICAL SCIENCES SUBSCORES FOR WOMEN

NATURAL SCIENCES					BIOLOGICAL SCIENCES				
		Differences Among Means					Differences Among Means		
Group	Adj. Means	Natives	Jr. Col. Transfers	Four-Year Transfers	Group	Adj. Means	Natives	Jr. Col. Transfers	Four-Year Transfers
Natives	518	--	15	39*	Natives	52.64	--	2.22	5.38*
Jr. College Transfers	533		--	24	Jr. College Transfers	54.86		--	3.16
Four-Year Transfers	557			--	Four-Year Transfers	58.02			--
			($S_{.05}$ = 31.46)					($S_{.05}$ = 3.34)	

* $P < .05$

TABLE 10

ANALYSIS OF COVARIANCE TABLES FOR THE CLEP MATHEMATICS EXAMINATION AND SUBSCORES BY SEX

MEN					WOMEN				
Source	df	SS	MS	F	Source	df	SS	MS	F
MATHEMATICS									
Between					Between	2	6451	3226	0.73
Within	(Not Applicable)*				Within	115	505941	4399	
Total					Total	117	512392		
BASIC SKILLS									
Between	2	144	72	1.42	Between	2	117	58	1.14
Within	175	8852	51		Within	115	5883	51	
Total	177	8996			Total	117	6000		
CONTENT									
Between					Between	2	14	7	0.15
Within	(Not Applicable)*				Within	115	5534	48	
Total					Total	117	5548		

* Analysis of covariance not computed. Significant F ratio for test of homogeneity of regression.

Mathematics examination. Analyses of covariance were not computed on the basic score or Content subscore because the requirement of homogeneity of regression was not met. However, the unadjusted means in Table 6 showed that native men (645) scored slightly higher than four-year transfer men (638) and substantially higher than junior college transfer men (577).

Humanities. Analysis of covariance F ratios in Table 11 show that, for men, mean differences among the three groups of beginning juniors on the

TABLE 11

ANALYSIS OF COVARIANCE TABLES FOR THE CLEP HUMANITIES EXAMINATIONS AND SUBSCORES BY SEX

MEN					WOMEN				
Source	df	SS	MS	F	Source	df	SS	MS	F
HUMANITIES									
Between	2	8907	4453	1.03	Between	2	30388	15194	4.76*
Within	174	748901	4304		Within	116	370264	3192	
Total	176	757808			Total	118	400652		
FINE ARTS									
Between	2	139	69	1.42	Between	2	178	89	1.72
Within	174	8477	49		Within	116	5996	52	
Total	176	8616			Total	118	6174		
LITERATURE									
Between	2	47	24	0.54	Between	2	325	163	5.26**
Within	174	7542	43		Within	116	3588	31	
Total	176	7589			Total	118	3913		

* $P < .05$ ** $P < .01$

Humanities basic and subscores were not significant. However, significant F ratios were obtained for women on the Humanities basic score and the Literature subscore. Apparently, the differences among the three groups of women in the Humanities mean basic score were located in the literature area as evidenced by the nonsignificant F ratio for the Fine Arts subscore and the significant F ratio for the Literature subscore.

Analysis of the adjusted means with the Scheffe test (Table 12) found that four-year transfer junior women scored significantly higher than native junior

TABLE 12

RESULTS OF THE SCHEFFÉ TEST FOR JUDGING ALL CONTRASTS FOR THE HUMANITIES EXAMINATION AND LITERATURE SUBSCORE FOR WOMEN

HUMANITIES					LITERATURE				
		Differences Among Means					Differences Among Means		
Group	Adj. Means	Natives	Jr. Col. Transfers	Four-Year Transfers	Group	Adj. Means	Natives	Jr. Col. Transfers	Four-Year Transfers
Natives	534	--	6	34*	Natives	52.15	--	1.13	4.64*
Jr. College Transfers	540		--	28	Jr. College Transfers	53.28		--	3.51*
Four-Year Transfers	568			--	Four-Year Transfers	56.79			--
		($S_{.05}$ = 28.7)					($S_{.05}$ = 2.83)		

* $P < .05$

women on the Humanities basic score, and significantly higher than native junior women and junior college transfer junior women on the literature subscore. Differences between natives and junior college transfers were not significant.

Social Sciences-History. F ratios reported for men in Table 13 show that mean differences among natives, four-year college transfers, and junior college transfers were not significant on either the Social Sciences-History basic score or the two subscores, Social Sciences and History. The analysis of covariance was not computed on the Social Sciences-History basic score for women. However, the F ratios obtained for the two basic scores were nonsignificant.

Conclusions and Implications

Certain limitations of this study necessitate caution in drawing conclusions and making generalizations and inferences from the results of the data. First, although selective academic and nonacademic characteristics were controlled either by sampling or statistical procedures, all

TABLE 13

ANALYSIS OF COVARIANCE TABLES FOR THE CLEP SOCIAL SCIENCES-HISTORY EXAMINATION AND SUBSCORES BY SEX

MEN					WOMEN				
Source	df	SS	MS	F	Source	df	SS	MS	F
SOCIAL SCIENCES-HISTORY									
Between	2	14194	7099	1.89	Between				
Within	174	653455	3755		Within	(Not Applicable)*			
Total	176	667653			Total				
SOCIAL SCIENCES									
Between	2	203	102	2.40	Between	2	101	50	1.21
Within	175	7417	42		Within	116	4825	42	
Total	177	7620			Total	118	4926		
HISTORY									
Between	2	105	52	0.88	Between	2	169	84	1.65
Within	174	10330	59		Within	115	5858	51	
Total	176	10435			Total	117	6027		

* Analysis of covariance not computed. Significant F ratio for test of homogeneity of regression.

characteristics that may affect college achievement were not controlled. Second, students who presented histories of attendance at private colleges were not analyzed separately. Students predisposed to attend private schools may have interests and motivations which result in different achievement levels in specific areas (see Appendix A for summary of type of institutions attended prior to transfer). Third, the subjects consisted only of students who enrolled at the University of Illinois at Urbana-Champaign as juniors. Therefore, the subjects can not be

considered representative of their total respective groups. For example, junior college transfers studied were not representative of all students who completed junior college transfer programs, only those who enrolled at the University of Illinois at Urbana-Champaign after completing such programs.

Within the limitations of the study, the evidence shows that, as a group, students who transferred to the University of Illinois at Urbana-Champaign from junior colleges have lower HSPR and ACT-C than natives or four-year college transfers. Transfers from junior colleges also come from environments with lower socioeconomic status than University of Illinois native students or transfers from other four-year institutions.

Evidence from the administration of the CLEP General Examinations suggest that attendance at either a junior college or four-year institution during the first two years of college does not appear to affect achievement in the General Education areas significantly for those students who eventually enroll at the native institution. Notable exceptions occurred in the areas of literature, where women four-year transfers scored higher than their junior college transfer and native counterparts, and biological sciences, where four-year transfer women scored higher than native women. These exceptions and the fact that 53 percent of four-year transfer women completed all lower division work at private institutions (Appendix A) appear to justify treatment of transfers from private institutions as a separate group in future analyses. No significant differences in relative achievement were noted between native students and junior college students.

These data seem to indicate that, generally, students who completed lower division requirements in junior colleges and transferred to four-year institutions progressed academically during the first two years of college at a pace equivalent to

students who completed lower division requirements in four-year institutions. Differences in level of achievement after two years of college may be attributed to differences in student characteristics which are correlates of academic performance at the time of freshmen registration rather than to types of institution of attendance. When student characteristics are controlled, results of the educational program experienced by junior college transfer students are not significantly different from results of the educational experiences of students attending the first two years at four-year institutions. This suggests that the gross influences of junior colleges on academic achievement in five general education areas as measured by CLEP General Examinations are not different from the gross influences of a multiversity or other four-year colleges and universities during the first two years of college.

If the results of this study are found to be consistent with similar institutional or statewide studies, implications are obvious for states with, or considering, master plans for higher education which include junior colleges as a major partner in the higher education system. This study provides information which supports the implied assumption in master plans that the content and quality of lower division programs in junior colleges, four-year colleges, and a multi-purpose university provide educational experiences which result in equivalent academic achievement for students with similar characteristics.

REFERENCES

College Entrance Examination Board. Score interpretation guide: College-Level Examination Program. Princeton, N. J.: CEEB, 1967.

Cross, K. P. The junior college student: A research description. Princeton, N. J.: Educational Testing Service, 1963.

Elashoff, J. D. Analysis of Covariance: A delicate instrument. American Educational Research Journal, 1969, 6, 383-401.

Ellis, R. L., Lane, W. C., & Olesen, V. The Index of Class Position: An improved intercommunity measure of stratification. American Sociological Review, 1963, 28, 271-277.

Hills, J. R. Transfer shock: The academic performance of the junior college transfer. The Journal of Experimental Education, 1965, 3, 201-215.

Illinois Council on Articulation. Performance of Transfer Students Within Illinois Institutions of Higher Education. Research monogram published by Council on Articulation, Illinois Conference on Higher Education, November, 1971.

Jordan, A. M. A study of transfer students. High School Journal, 1941, 24, 81-86.

Kirk, B. A. Comparison of transfer students by source of origin with entering students on the College Qualification Test. Junior College Journal, 1958, 29, 218-221.

Kirk, R. E. Experimental design: Procedures for the behavioral sciences. Belmont, Cal.: Brooks & Cole, 1968.

Knoell, D. M. & Medsker, L. L. From junior to senior college: A national study of the transfer student. Washington, D. C.: American Council on Education, 1965.

Kochersberger, R. C. A comparison of achievement of general biology students in a community college with similar students in a university as related to their backgrounds. Dissertation Abstracts, 1966, 27, Section A, 417-418.

Lavin, D. E. The prediction of academic performance New York: Russell Sage Foundation, 1965.

Lord, F. M. Large-sample covariance analysis when the control variable is fallible. American Statistical Association Journal, 1960, 55, 307-321.

Rodes, H. P. Successful transfer in engineering. Junior College Journal, 1949, 20, 121-127.

Trent, J. W. & Medsker, L. L. Beyond high school. San Francisco: Jossey-Bass, 1968.

Willingham, W. W. & Findikyan, N. Patterns of admission for transfer students. New York: College Entrance Examination Board, 1969.

Winer, B. J. Statistical principles in experimental design. New York: McGraw-Hill, 1962.

APPENDIX A

DISTRIBUTION OF TRANSFER STUDENTS TESTED BY TYPE OF INSTITUTION OF PREVIOUS ATTENDANCE AND SEX

Type of Institution of Previous Attendance	Sex		Total	Percent of Total
	Men	Women		
Junior College Transfers				
Illinois Public	74	23	97	90.65
Illinois Private	6	2	8	7.48
Non-Illinois	1	1	2	1.87
Total, Junior College Transfers	81	26	107	100.00
Four-Year Transfers				
Illinois Public	25	10	35	33.33
Non-Illinois Public	7	10	17	16.19
Illinois Private	9	15	24	22.86
Non-Illinois Private	9	13	22	20.95
Combinations of Attendance	2	5	7	6.67
Total, Four-Year Transfers	52	53	105	100.00

Appendix B

SUMMARY OF CLEP GENERAL EXAMINATION MEANS ADJUSTED BY ANALYSIS OF COVAR

Examination	MEN					
	Native (N = 48)	Junior College Transfers (N = 81)	Four-Year College Transfers (N = 52)	F	Native (N = 43)	Junior College Transfer (N = 26)
1. English Composition	510	518	510	0.34	563	580
2. Natural Sciences	595	589	599	0.26	518	533
a. Biological Sciences	56	56	58	1.25	53	55
b. Physical Sciences	59	60	61	--*	51	52
3. Mathematics	614	603	627	--*	540	520
a. Basic Skills	60	59	61	1.42	55	52
b. Content	61	60	63	--*	54	52
4. Humanities	486	486	502	1.03	534	540
a. Fine Arts	48	48	50	1.42	54	54
b. Literature	49	49	50	0.54	52	54
5. Social Sciences-History	542	550	566	1.89	542	544
a. Social Sciences	54	56	57	2.40	56	56
b. History	52	53	54	0.88	51	52

* Analysis of covariance not computed because of significant F ratio for test of homogenei

** P<.05

Appendix B

CLEP GENERAL EXAMINATION MEANS ADJUSTED BY ANALYSIS OF COVARIANCE AND F-RATIOS

MEN				WOMEN			
ative = 48)	Junior College Transfers (N = 81)	Four-Year College Transfers (N = 52)	F	Native (N = 43)	Junior College Transfers (N = 26)	Four-Year College Transfers (N = 53)	F
510	518	510	0.34	563	580	568	0.93
595	589	599	0.26	518	533	557	4.31**
56	56	58	1.25	53	55	58	4.30**
59	60	61	--*	51	52	52	0.18
514	603	627	--*	540	520	527	0.73
60	59	61	1.42	55	52	53	1.14
61	60	63	--*	54	52	52	0.15
486	486	502	1.03	534	540	568	4.76**
48	48	50	1.42	54	54	56	1.72
49	49	50	0.54	52	54	56	5.26**
542	550	566	1.89	542	544	563	--*
54	56	57	2.40	56	56	57	1.21
52	53	54	0.88	51	52	54	1.65

computed because of significant F ratio for test of homogeneity of regression.